

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

RESIDUE MANAGEMENT, SEASONAL

(Ac.)

CODE 344

DEFINITION

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface during a specified period of the year, while planting annual crops on a clean-tilled seedbed, or when growing biennial or perennial seed crops.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion.
- Reduce soil erosion from wind.
- Reduce off-site transport of sediment, nutrients or pesticides.
- Manage snow to increase plant available moisture.
- Provide food and escape cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland and other land where crops are grown.

Seasonal residue management includes managing residues of annual crops from harvest until the residue is:

- Buried by tillage for seedbed preparation
- Removed by grazing, or
- Mechanically removed

It also includes the management of residues from biennial or perennial seed crops from the time of seed harvest until regrowth begins the next season.

CRITERIA

General Criteria Applicable to All Purposes

Residue shall be uniformly distributed over the entire field.

Combines or similar harvesting machines shall be equipped with spreaders capable of redistributing residues over at least 80 percent of the working width of the header.

Residues shall not be burned unless burning is an appropriate tactic to manage a specific field crop pest or pests within an integrated pest management (IPM) program as described and recommended by Iowa State University Extension. Burning may also be allowed if fire management of a field is required for control of a specific pest under the order of a State or Federal regulatory pest management agency.

Additional Criteria to Reduce Sheet and Rill Erosion and Erosion from Wind

The amount and orientation of residue needed to reduce erosion within the soil loss tolerance (T) and maintain or improve soil quality by maintaining or improving Soil Quality Index (SCI) or any other planned soil loss objective shall be determined using Revised Universal Soil Loss Equation version 2 (RUSLE2), WEQ or current approved erosion prediction technology.

Partial removal of residue by means such as baling, grazing, or other harvest methods shall be limited to retain the amount needed to meet the erosion reduction objective. The remaining residue shall be maintained on the surface through periods when erosion has the potential to occur, or until planting, whichever occurs first. Erosion prediction estimates shall account for the effects of other practices in the conservation management system.

Any tillage that occurs during the management period shall be limited to methods that maintain the planned cover conditions. At a minimum, residues may be grazed, baled, chiseled, or disked after harvest, providing a minimum of 50 percent cover is left on the soil surface during the non-crop period from harvest to seedbed preparation, 30 days or less prior to planting.

Additional Criteria to Reduce Off-site Transport of Sediment, Nutrients or Pesticides.

The amount and orientation of residue required to reduce off-site movement of agricultural chemicals during the specified period shall be determined using the appropriate assessment tool(s) [Windows Pesticide Screening Tool (WIN-PST 3), Phosphorus Index (PI), erosion prediction technologies, or other recognized tools] for the site conditions.

Additional Criteria to Manage Snow to Increase Plant-Available Moisture

Harvesting equipment shall be adjusted to leave standing stubble as high as possible by the harvesting operation, but not less than six inches in any case except for soybean stubble. Stubble shall be maintained in a standing orientation over winter to trap and retain snow.

Any tillage that occurs during this period shall be limited to undercutting tools such as blades, sweeps, deep tillage implements such as rippers or subsoilers or similar implements that minimize residue flattening or burial.

Additional Criteria to Provide Food and Escape Cover for Wildlife

The amount of residue, height of the stubble, and length of the management period necessary for meeting habitat requirements for the target species or wildlife population shall be determined using an approved habitat evaluation procedure. Refer to practice standard "[Upland Wildlife Habitat Management \(645\)](#)" for recommendations.

Residues shall not be removed unless it is determined by the habitat evaluation procedure that such removal will not adversely affect habitat values.

Tillage operations shall be delayed until the end of the management period to maintain the food and cover value of the residue. Crop stubble will be left standing over winter.

CONSIDERATIONS

Removal of plant residue by baling or grazing may have a negative impact on resources. These activities should not be performed without full evaluation of impacts on other resources.

Production of adequate amounts of crop residue necessary for the proper functioning of this practice can be enhanced by selection of high residue producing crops and crop varieties, by the use of cover crops, and by adjustment of plant populations and row spacing.

When planting in a low residue seedbed, completing tillage and planting in a single operation, or by performing primary tillage no more than three days before planting can minimize exposure to erosion; and in limited moisture areas, can conserve moisture for germination.

The effectiveness of stubble to trap snow increases with stubble height. Variable height stubble patterns may be created to further increase snow storage.

Leaving one or two rows of unharvested crop standing at intervals across the field

can enhance the value of residue for wildlife habitat. Unharvested crop rows have the greatest value when they are adjacent to other cover types, such as grassy or brushy areas or woodland.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria described in this standard.

The following components shall be included in the case file for practice documentation:

- Location identification (Field # or CTU #).
- Method of managing crop residue.
- Percent of residue cover on ground during critical periods.
- Acres applied.

Specifications shall be recorded using approved job sheets, narrative statements in the conservation plan, or other acceptable methods.

OPERATION AND MAINTENANCE

No operation and maintenance requirements, national in scope, have been identified for this practice.

REFERENCES

The following publications are available at NRCS field offices or on the Iowa NRCS Home Page at: <http://www.ia.nrcs.usda.gov>.

- NRCS [Upland Wildlife Habitat, Practice Code 654](#).
- Crop Residue Management Guide, NRCS publication SCS-CRM-01, January 1992.
- Iowa Job Sheet – Crop Residue Management, NRCS, August 1991.
- Revised Universal Soil Loss Equation Version 2 (RUSLE2) website: http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm

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The following information provides additional guidance for carrying out selected components of this practice:

The amount of crop residue produced and the percentage of residue covering the soil surface will vary with crop species, variety, yield, time of tillage (spring vs. fall), and depth and speed of tillage operation. The following information can be used in planning crop residue use for common field crops.

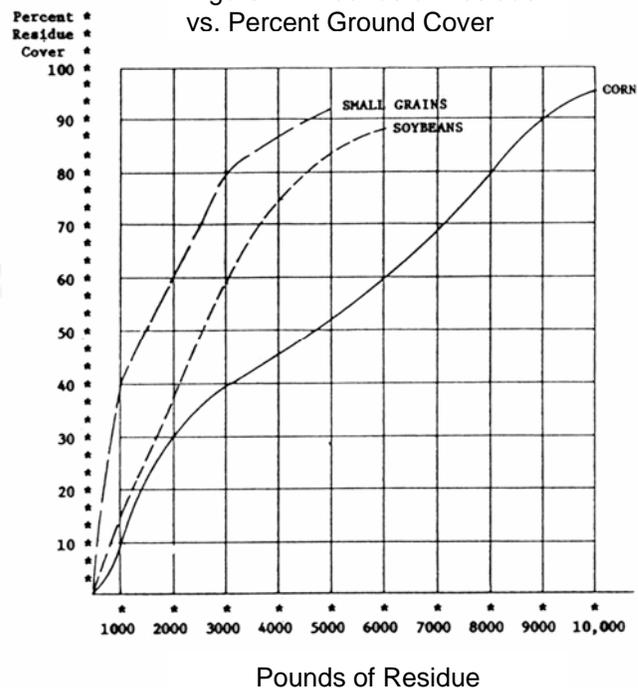
Corn. For each bushel of corn, approximately 56 pounds of residue is produced.

Soybeans. For each bushel of soybeans, approximately 45-90 pounds of residue is produced. The amount of soybean residue produced can vary greatly with the variety and time of planting. Late maturing, taller soybeans normally produce much higher residue levels than earlier maturing, shorter varieties.

Small Grain. For each bushel of winter small grain, approximately 100 pounds of residue is produced. Spring small grain will produce approximately 60-75 pounds of residue per bushel.

Pounds of Residue and Percent Ground Cover. Figure 1 can be used to estimate percent ground cover based on pounds of residue produced.

Figure 1 – Pounds of Residue vs. Percent Ground Cover



Note: Values presented in Figure 1 are the best estimates that can be obtained from actual measurements and published research data. Published data varies considerably between sources.

Percent Ground Cover and Tillage Operations. Residue cover will vary depending upon weather conditions, soil type, tillage speed, and the number and type of tillage operations. A rough estimate of the residue cover remaining after using a tillage and planting system can be obtained by multiplying the percentages together for each operation as shown in the following table.

